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Rediscovery and distribution extension of the rare Kukri Snake, *Oligodon hamptoni* Boulenger, 1918 (Reptilia, Serpentes, Colubridae), with the first record of this species from China

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Abstract

Oligodon hamptoni is a rare species of Kukri Snake known from only two specimens, both collected nearly a century ago in northern Myanmar. Here, we report the third record of this species based on a photograph taken in Mt. Gaoligongshan, Tengchong City, Yunnan Province, China, approximately 235 km northeast of the nearest record in Bhamo District, Kachin State, Myanmar. We also provide a detailed redescription of the holotype, showing that the photo record from Mt. Gaoligongshan can be unambiguously identified to this species. This rediscovery represents the first observation of *O. hamptoni* in China and is the first report of this species in almost 100 years.

Key Words

biodiversity, Gaoligongshan Nature Reserve, morphology, Myanmar, snakes, Squamata

Introduction

Kukri Snakes of the genus *Oligodon* (H. Boie in Fitzinger, 1826) are a speciose group of colubrid snakes widely distributed across the Asian continent as far west as Turkmenistan and as far east as the Maluku Islands of Indonesia (Green 2010; Uetz et al. 2020). While several species of *Oligodon* are locally abundant throughout their range, most species in the genus are known from a handful of specimens and are poorly understood by herpetologists (Orlov et al. 2010; Supsup and Carestia 2020).

Oligodon hamptoni Boulenger, 1918 represents one of the rarest Kukri Snake species in mainland Southeast Asia (Cambodia, southern China, Laos, Myanmar [Burma], Peninsular Malaysia, Thailand and Vietnam). It was described based on a single male specimen collected from "Mogok, Upper Burma" (Mogok, Pyin Oo Lwin District, Mandalay Region, Myanmar) approximately 112 years ago. Based on Boulenger's (1918) original description, the type specimen was a "handsome and very remarkable snake", which had a vibrant dorsum consisting of a large yellow vertebral stripe situated between a pair of reddish-brown stripes and a bright red venter with alternating black bars across the body. A few years later, Wall (1925) reported a second specimen of this species, an adult female from "Sinlum Kaba" (Sinumkaba, Bhamo District, Kachin State, Myanmar), and provided additional morphological information on the species. Unfortunately, Wall's specimen

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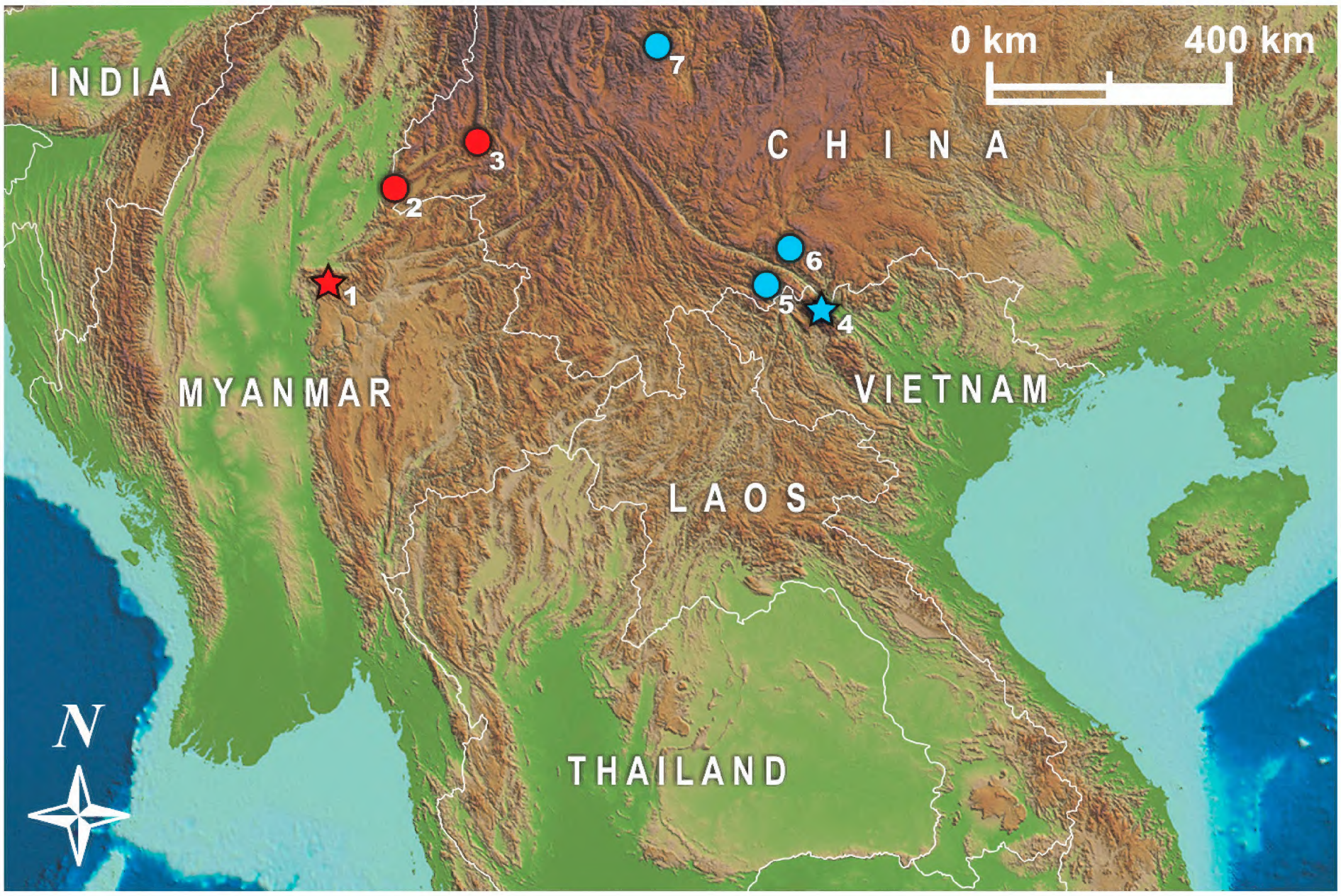

Figure 1. Distribution of *Oligodon hamptoni* (red) and *Oligodon lacroixi* (blue). Star denotes the type locality. Localities: (1) Mogok, Pyin Oo Lwin District, Mandalay Region, Myanmar (type locality see Boulenger 1918); (2) Sinumkaba, Bhamo District, Kachin State, Myanmar (Wall 1925); (3) Tengchong City, Yunnan Province, China (this paper); (4) Chapa (now Sa Pa), Lao Cai Province, Vietnam (Angel and Bourret 1933; Orlov et al. 2010); (5) Jinping County, Honghe, Yunnan Province, China (Yang and Rao 2008); (6) Mengzi, Honghe, Yunnan Province, China (He and Yang 1979); (7) Panzhihua, Sichuan Province, China (Zhao 2006).

was eviscerated and deposited in the osteological collection of the Natural History Museum, London (NHMUK, formerly BMNH), preventing a re-examination of its morphology. Since Wall's publication, *O. hamptoni* has been known only from a preserved skull and the type specimen.

On 8 October 2020, one of us (JHY) received a photograph of a moderately-sized colubrid snake from Mt. Gaoligongshan, Tengchong City, Yunnan Province, China (Fig. 1) referable to the genus *Oligodon*. After further examination, we conclude that this snake can be unambiguously identified to *O. hamptoni*, thus representing the first record of this species in China and the first observation of this species in almost 100 years. The subsequent rediscovery of this species provides an opportunity to document the live color pattern of *O. hamptoni*. Herein, we present a detailed description of this poorly known species based on a re-examination of the holotype and the new voucher photograph from China.

Methods

We inspected photographs of a snake referable to *O. hamptoni* from Yunnan Province, China and compared its external features to the holotype specimen (NHMUK 1946.1.1.71) from Mogok, Mandalay Region, Myanmar. The photographs were taken by Mr. Zhuan-Yun Hu, a forestry ranger in Tengchong section of Gaoligongshan National Nature Reserve (TC-GLGS, hereinafter), on his way back home after regular forest patrol. Owing to the incidental nature of the observation, the specimen observed was not collected. Instead, the photographed individual was compared directly to the holotype, along with the published description of a second specimen from Sinlumkaba, Kachin State, Myanmar (NHMUK 1930.5.8.529) given by Wall (1925). The photographs and video taken were deposited in the citizen/community science platform iNaturalist.org and are accessible by the following link (https://www.inaturalist.org/observations/68037252).

The holotype of *O. hamptoni* had a small ventral incision underneath the tail, which allowed us to confirm the sex of the specimen. Body measurements such as Snout-Vent Length (SVL), Tail Length (TailL) and Total Length (TotalL) were taken using a flexible ruler. All other head and scale measurements were taken using Mitutoyo Digital Calipers and estimated to the nearest 0.1 mm. The measurements taken include: head length, measured from the anterior margin of the jawbone (rictus) to the tip of the rostral scale (HeadL); head width, measured from the widest point between the head (HeadW); snout length,

measured from the anterior point of the eye to the tip of the rostral scale (SnL); snout width, measured as a straight-line distance between the median of both nostrils (SnW); eye diameter, measured horizontally from both posterior and anterior margins of the eye (EyeD); interorbital distance, the straight-line distance between both eyes at the border of the supraoculars (IOD); frontal length, the maximum length of the frontal scale (FrontalL); frontal width, the maximum width of the frontal scale (FrontalW). Dorsal scales were counted anteriorly at one head length behind the head, at midbody, namely halfway between the terminus of the head and the vent, and posteriorly at one head length anterior to the cloacal plate (given as anterior–midbody–posterior in the description); ventral scales were counted according to Dowling (1951); the tail tip was not included in the number of subcaudal scales; counts for head scales are given in left/right order. The number of total body scales was calculated as the sum of the number of ventral scales, the cloacal plate (considered a single scale regardless of whether it is single or divided) and the number of subcaudal scales. Relative head scale angle and shape terminology are adapted from Kaiser et al. (2019). Museum abbreviations follow Sabaj (2016) and Uetz et al. (2020) unless otherwise noted.

Results

Redescription of the holotype of *Oligodon hamptoni*

The holotype of *O. hamptoni* (NHMUK 1946.1.1.71) is an adult male from "Mogok, Upper Burma." [= now Mogok, Pyin Oo Lwin District, Mandalay Region, Myanmar], collected between 1907–1908 by Mr. Herbert Hampton (Fig. 2). The etymology of the species epithet *hamptoni* is a patronym for Mr. Hampton. No common name has been given to this species, so we suggest the

Figure 2. Holotype specimen of *Oligodon hamptoni* (NHMUK 1946.1.1.71). Head in dorsal (**A**), lateral (**B**), and ventral (**C**) aspects, general view of the holotype in dorsal (**D**) and ventral (**E**) aspects. Photographs by Justin L. Lee.

English name "Ruby Valley Kukri Snake", in reference to the type locality of this species (Mogok, Mandalay Region), a town in Myanmar famous for its Ruby Mines. For Chinese common name, we propose "Tiao Wen Xiao Tou She (条纹小头蛇)".

Measurements of the holotype are as follows: SVL 476 mm; TailL 69 mm; TotalL 545 mm; TailL/TotalL 0.127; HeadL 18.0 mm; HeadW 10.8 mm; SnL 6.2 mm; SnW 5.3 mm; EyeD 2.9 mm; FrontalL 4.8 mm, FrontalW 4.6 mm; IOD 6.8 mm; HeadL/W 0.60; SnL/HL 0.34; EyeD/SnL 0.47; EyeD/HeadL 0.16; FrontalL/W 1.04.

Body stout, slightly cylindrical; head barely distinct from neck, but narrower than width at midbody, ovoid in dorsal view; snout moderately elongate, ending bluntly; width of snout narrower than rest of head; tail short, tapering; nostrils subtriangular shaped, pointed laterally; eye round, large compared to head; pupil round; rostral visible from above; portion visible from above around half as long as width; rostral medially splitting prefrontals; posterior scale suture of rostral with prefrontals "deep-V" shaped, with the vertex of the rostral rising far onto the dorsal surface of the head in-line with the nostrils (narrow obtuse angle); internasals notably absent, fused with prefrontals; prefrontals subpentagonal shaped, 1.1 times wider than long; border between rostral and prefrontals round while border between frontal and supraoculars linear straight; prefrontals in contact with frontal, preocular, loreal and nasal; frontal subhexagonal and shield shaped, roughly equal in length and width, 2.8 times longer than prefrontal sutre; frontal in contact with supraoculars, prefrontals and parietals; anterior angle formed by suture of frontal bordering prefrontals broadly obtuse (~135°), eyes placed after the anterior edge of the frontal; posterior angle formed by the sutures producing the posterior vertex of the frontal narrowly obtuse (~106°); supraoculars subrectangular shaped, 2.3 times longer than wide, around three-quarters the length of frontal and one third its width; parietals subpentagonal, 1.5 times longer than wide, widest anteriorly; parietal sutre slightly shorter than frontal; parietals in contact with frontal, supraoculars, first postocular, both temporal scales and five total occipital scales; anterior parietal angle formed by the sutures between the parietal/frontal and the suture between the supraocular/parietal moderately obtuse (~125°) with the lateral ray of the angle pointing posterolaterally; nasal scale triangular, divided below the nostril, in contact with the first supralabial, loreal, prefrontal and rostral; 5/5 supralabials, second and third touching eye, fourth supralabial largest; 6/6 infralabials, first pair contacting medially, first four touching anterior chin shields; fourth infralabial the largest; 1/1 preocular; 1/1 loreal, pentagonal shaped, longer than wide; 2/2 postoculars, upper scale slightly larger than lower; 1+1 temporals, anterior temporal bordering third and fourth supralabials, posterior temporal bordering fourth and fifth supralabial. Mental scale triangular, wider than long; anterior chin shields longer than wide, round at anterior edge, linear at posterior edge; posterior chin shields equal in length to anterior chin shields; chin shields and first infralabials separated by the mental groove; three gular scales posterior to the chin shields, followed by a single preventral scale.

Dorsal scales 15–15–15, all smooth; 159 ventrals; 32 subcaudals; 192 total body scales, subcaudal ratio 0.17; cloacal plate divided; maxillary teeth 9/9, posterior teeth gradually becoming enlarged and blade-like. We did not re-examine the hemipenis of the specimen, owing to its fragile nature. Smith (1943) stated that the hemipenis extends to the 11th subcaudal *in-situ* and is unilobed, i.e., non-forked; the apical half is flounced, the folds partly connected to form large calyces, the lips of which have small spines; the proximal area is spinose, the spines being comparatively stout and of almost uniform size throughout. It should be noted that Boulenger (1918) stated the holotype had a single postocular, but Wall (1925) and our re-examination confirm the presence of 2/2 postoculars.

After approximately 112 years in preservation, top of dorsum with cream-colored vertebral stripe around 1.0–1.5 dorsal scales wide situated between two light-brown dorsal stripes of equal width and edged with dark-brown; stripes originate two scales below the parietal and end along the tail; vertebral stripe interrupted just before tail-tip by single brown ring; tail tip with creamy-white spot; dorsal ground color on flanks grayish-brown with small dark-brown vermiculations concentrated along the margins of the dorsal scales along with two rows of dorsolateral stripes 1.0 dorsal scales wide, slightly edged in beige, originating at nape then extending across body before merging as one single lateral stripe on the tail; uppermost pair of stripes dark-brown, immaculate anteriorly, small beige vermiculations starting at midbody; bottommost row of stripes jet black, broken-up throughout, often patterned with small dark-brown and white irregular-shaped spots; dorsal portion of head plain brown, darker-brown or black along gular region and on labials; two oblique beige-colored postocular chevrons edged with black present on head, merging on top of frontal region to form a single lyre-shaped mark; first dorsal chevron on head originating as a narrow line at the anterior portion of the frontal, extending across the temporals, supraocular and fourth and fifth supralabials as an oblique temporal bar on each side of the head before ending at the infralabials; second chevron attached to the first as wide lines along the posterior portion of frontal, tapering posteriorly past parietals before ending at the lateral portion of the nape as narrow oblique streaks; between chevrons, a light-brown spatulate spot present, partially connected to rest of nape, interrupting second chevron from connecting; snout brownish with a crescent-shaped beige-colored band present along the anterior portion of the prefrontal and edge of rostral ending at the first and second supralabials; underside of head cream-colored with irregularly-shaped black spotting concentrated on the infralabials and gular scales; venter light-cream with large black rectangular-shaped bars across the body, stopping before the cloacal plate; underside of tail same color as rest of venter but immaculate. In the original description, Boulenger (1918) described the now beige-colored vertebral

stripes and oblique chevrons as a yellow in coloration, and the venter as bright red, both of which have faded after several decades due to preservation fluid. Otherwise, the color pattern of the holotype is identical to Boulenger's original description.

New record of *Oligodon hamptoni* from Yunnan Province, China

The new record of *O. hamptoni* was observed by Zhuan-Yun Hu, a local forestry ranger of TC-GLGS, at 1656 hrs on 8th July 2020 on rural county road near Dahaoping village, Tengchong City, Yunnan Province, China (24°59.6445'N, 98°43.79'E; WGS84, 1926 m elevation) (Fig. 3). This locality is situated on the western foothills of the Gaoligong Mountains, a ridge associated with the southern extent of the Hengduan Mountain range (Fig. 1). The snake was first observed entering the roadway when it was photographed and filmed using a mobile phone as it made its way across the road-edge before disappearing into the forest (https://www.inaturalist.org/observations/68037252). The surrounding habitat consists of highly degraded mid-montane moist evergreen broad-leaved forest (Fig. 3A).

The coloration in life is as follows: top of dorsum with a broad yellow-beige vertebral stripe between two dusky grayish-red stripes, equal in width and edged in black; all stripes starting at nape, continuing onto tail; flanks blue-gray, interrupted by two narrow black lateral stripes merging to form a single narrow lateral stripe at the tail, bottommost lateral-stripe broken and partially interrupted by occasional irregularly shaped white spots; dorsal scales along flanks with dark-gray margins forming a weak lateral line extending from the anterior portion of the body across the tail; head reddish-brown with yellow-beige postocular streaks edged with black, first starting as narrow line above the frontal region of the head forming crescent-shaped mark before widening below the temporal region as an oblique bar, second starting before nape as a narrow-shaped chevron then extending across neck; snout same ground color as dorsum, encircled by a beige crescent-shaped preocular streak, widest above nostrils, narrowing towards the labial region. These features agree with our redescription of the type specimen and the original description from Boulenger (1918) (Fig. 4).

While the resolution of the photographs and video taken prevent us from obtaining accurate scale counts, we can confidentially identify the specimen to *O. hamptoni* based on a combination of color pattern characteristics and body

Figure 3. Natural habitat (**A**) and a photo record (**B**) of *Oligodon hamptoni* in Tengchong City, Yunnan Province, China. Photographs by Zhuan-Yun Hu.

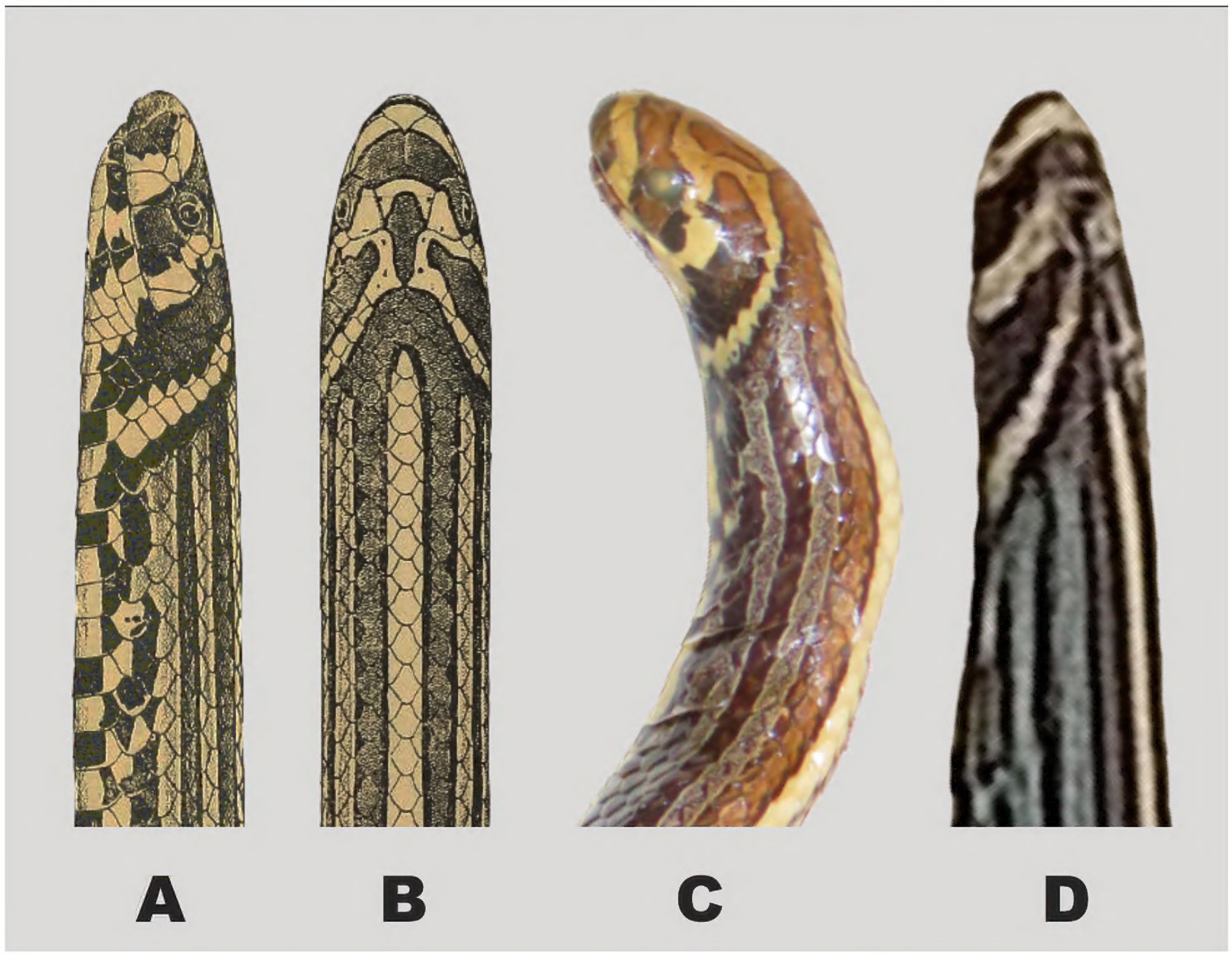

Figure 4. Morphological comparison of the holotype specimen of *Oligodon hamptoni* (NHMUK 1946.1.1.71) with the newly recorded specimen from Baoshan, Yunnan Province, China. (**A**) Lateral and (**B**) dorsal aspects of the holotype specimen of *Oligodon hamptoni* (NHMUK 1946.1.1.71) from the original description (Boulenger, 1918); (**C**) dorsolateral aspect of the holotype specimen of *Oligodon hamptoni* (NHMUK 1946.1.1.71), photograph by Justin L. Lee; and (**D**) dorsolateral aspect of the Tengchong specimen (not collected), photograph by Zhuan-Yun Hu.

proportions. The snake's movement, size of the head in relation to the rest of the body, short tapering tail, and overall shape (referred to by birdwatchers as "GISS", namely the overall appearance and impression of an animal) is typical of most *Oligodon* and eliminates almost all other colubroid snake genera found in the region. Out of the other fourteen species of *Oligodon* native to China, only three species have a predominately striped pattern, those being *Oligodon catenatus* Blyth, 1854, *Oligodon eberhardti* Pellegrin, 1910 and *Oligodon lacroixi* Angel & Bourret, 1933. The former two species are much more elongate and slender in general appearance compared to *O. hamptoni* and *O. lacroixi*, with both species possessing a brown dorsal ground color with diamond or 'lozenge-shaped blotches that merge along the vertebral line and form a weak series of irregular stripes. Furthermore, *O. lacroixi* has a dark-gray dorsum with a row of small light-orange vertebral spots that is diagnostic compared to *O. hamptoni*. Outside of China, the only other species of *Oligodon* from adjacent mainland Southeast Asia that could be confused with this species is *Oligodon erythrogaster* Boulenger, 1907, native to Nepal and north India. *Oligodon hamptoni* is remarkably similar in color pattern to the species *O. erythrogaster*. Indeed, Smith (1943) considered the two species to be close relatives and placed them in the same species group. However, the flanks of most *O. erythrogaster* specimens have multiple rows of narrow black dorsolateral stripes and the vertebral stripe present is normally lighter-brown and duskier in coloration compared to *O. hamptoni*. Additional comparisons between *O. hamptoni* and other taxa from proposed species-groups can be found in Tables 1, 2.

Discussion

The observed *Oligodon hamptoni* we document in this paper represents the first record of this species from China. With the recent description of *Oligodon lipipengi* Jiang, Wang, Li, Ding, Ding & Che, 2020 from Tibet (Che et al. 2020), this raises the number of *Oligodon* species known from China to fifteen. Additionally, the record from Yunnan Province represents the first live photographs ever

Table 1. External morphometric and meristic comparisons between *Oligodon hamptoni* and other historically grouped species. Abbreviations for morphological characters are as follows: tail length-total length ratio given as a percent (TailLR), number of maxillary teeth (MT), internasals fused with the prefrontals (INF), number of supralabials (SL), number of supralabials in contact with the eye (SLE), number of infralabails (IL), nasal scale entire or divided (NAS), loreal scale present or absent (LOR), number of preocular scales (PrO), number of postocular scales (PtO), number of anterior temporal scales (AT), number of posterior temporal scales (PT), number of dorsal scale rows counted anteriorly, at midbody and posteriorly (DSR), number of ventrals (VEN), number of subcaudals (SC), cloacal plate single or divided (CP). Sources for data in this table include Pellegrin (1910), Smith (1943), Wagner (1976), Dowling and Jenner (1989), Ganesh et al. (2009), Das (2010), Green (2010), Orlov et al. (2010), Pham et al. (2014) and Lalbiakzuala and Lalremsanga (2020).

Species	TailLR	MT	INF	SL	SLE	IL	NAS	LOR	PrO	PtO	AT	PT	DSR	VEN	SC	CP
hamptoni	12.7	9	Yes	5	2+3	5	Entire	1	1	2	1	1	15–15–15	159–174	30–32	Divided
brevicauda	9.6–11.0	7–8	Yes	7	3+4	7	Divided	0	2	2	1–2	2	15–15–15	158–173	25–29	Divided
catenatus	12.6–13.3	7	Yes	6	3+4	6	Entire	0	1	1–2	1	2	13–13–13	179–212	31–43	Divided
dorsalis	16.1–19.3	6–7	No	7	3+4	7	Divided	1	1	1	1	2	15–15–13	162–188	27–51	Divided
eberhardti	15.1	7	Yes	6	2+3	6	Entire	1	1	1	1	2	13–13–13	165–187	31–40	Divided
erythrogaster	16.7	7–8	No	7	3+4	7	Entire	1	1	2	1	2	17–17–15	163–186	42–59	Divided
lacroixi	10.5–11.5	8–12	Yes	5	2+3	6	Entire	0	1	2	1	2	15–15–15	162–178	25–34	Divided
mcdougalli	13.7	6	No	7	3+4	7	Entire	0	1	1	1	2	13–13–13	199	40	Divided
travancoricus	0.11–0.15	7	No	7	3+4	8	Divided	0	1	2	1	2	17–17–15	145–155	34–37	Divided
venustus	13.2	7–8	Yes	6–8	3+4	7	Divided	0–1	1	2	1	2	17–17–15	138–165	27–41	Divided

Table 2. Morphological comparisons in hemipenial morphology and color pattern between *Oligodon hamptoni* and other historically grouped species. The list of references corresponds to both Tables 1, 2.

Species	Hemipenis shape and ornamentation	Dorsal color pattern	Ventral color pattern	Distribution	References
hamptoni	Unilobed, calyculate and flounced along apex with spines	Broad yellow-beige vertebral stripe between two dusky grayish-red stripes	Bright red with large rectangular-black shaped bars	N Myanmar and S Yunnan Province, China	Smith (1943); this study
brevicauda	–	Reddish-brown with brown vertebral stripes	Whitish with black quadrangular spots	S India (south of Goa)	Smith (1943); Green (2010)
catenatus	Unilobed, flounced along apex, spinose throughout	Brown with lozenge-shaped vertebral spots and longitudinal stripes	Red with black quadrangular spots	NE India, N Myanmar, S China, Laos, N Vietnam	Smith (1943); Pham et al. (2014); Lalbiakzuala and Lalremsanga (2020)
dorsalis	Bilobed, flounced along apex, spinose	Bluish-gray or brown with orange vertebral stripe between brownish stripes	Uniform orange or white with black quadrangular spots	NE India, Bangladesh, Myanmar	Smith (1943); Das (2010), Green (2010)
eberhardti	Unilobed, flounced along apex, spinose throughout	Brown with lozenge-shaped vertebral spots	Red with black quadrangular spots or dark bars	Laos, N Vietnam, S China	Pellegrin (1910); Das (2010), Green (2010)
erythrogaster	Unilobed, flounced along apex, spinose throughout	Broad light-brown vertebral stripe between two dusky grayish-red stripes	Bright red with large rectangular-black shaped bars	Nepal and N India	Smith (1943); Green (2010)
lacroixi	Unilobed, ornamentation unknown	Gray with brown vertebral stripes and orange vertebral spots	Bright red with large rectangular-black shaped bars	S China, N Vietnam	Smith (1943); Orlov et al. (2010)
mcdougalli	Bilobed, flounced along apex, spinose	Dusky-black, rufous-brown vertebral stripe edged with linear black spots	Black mottled with beige	S Myanmar	Dowling and Jenner (1989)
travancoricus	Unilobed, spinose at base, flounced at apex	Gray-brown with 25–33 light-edged dark crossbars	Yellow or whitish with equal proportion black quadrangular spots	S India (Western Ghats)	Smith (1943); Ganesh et al. (2009)
venustus	Unilobed, spinose at base, flounced at apex	Gray-brown with 23–31 dark spots	Yellowish to whitish with black quadrangular spots in equal proportion.	S India (Western Ghats)	Smith (1943); Ganesh et al. (2009)

taken of this species, and the first observation in almost 100 years.

Since Wall's (1925) publication, no other *O. hamptoni* specimens have been found in Myanmar and the species is still represented by only one preserved specimen in museum collections. Therefore, an assessment of the phylogenetic position of *O. hamptoni* in relation to other members of the genus is challenging. Boulenger (1918) noted that the species shared several characteristics with another *Oligodon* he described from the same locality, *Oligodon herberti* Boulenger, 1905 (now a synonym of the species *O. catenatus*), but ultimately remarked that *O. hamptoni* was, "a much heavier snake… the largest and handsomest of all Oligodons". Pope (1935) suggested that *O. hamptoni* and the then recently described *O. lacroixi* were conspecific because he noted that there were very few differences in scalation between the two taxa. Smith (1943) also stated that *O. lacroixi* was "like *hamptoni*", but ended up recognizing both species in an informal species-group he classified as the "*dorsalis-erythrogaster-hamptoni* group", which also included *O. catenatus*, *Oligodon dorsalis* (Gray, 1853),

O. erythrogaster and *Oligodon mcdougalli* Wall, 1905. This classification scheme was followed by Dowling and Jenner (1989), but rejected by Wagner (1976), who elected to group *O. hamptoni* and *O. lacroixi* with *Oligodon brevicauda* Günther, 1862 and *O. dorsalis*. While we lack sufficient data from most species present in these groups to make further comments, unpublished research suggests that many of the characters used to group taxa within *Oligodon* may need to be re-assessed (Lee and Yushchenko et al. in prep). At the time of Pope (1935)'s publication, *O. lacroixi* was known from very few individuals and was considered rare. Subsequent fieldwork in Yunnan Province, China and north Vietnam has revealed additional specimens, and the species has been re-described in detail (Orlov et al. 2010). Enough morphological differences exist between the two taxa to warrant their separation; mainly, the lack of a loreal, six infralabials and 1+2 temporals in *O. lacroixi* (vs. loreal present, five infralabials and 1+1 temporals in *O. hamptoni*) along with their differentiating color patterns (Table 2). However, the two taxa are clearly similar and may share a close relationship with one another. Several drainage basins separate the distributions of both species, with *O. hamptoni* occurring within the confines of the Ayeyarwady (Irrawaddy) river drainage and *O. lacroixi* occurring east of the Salween (Nujiang) and Mekong (Lancang) river drainages. These rivers and corresponding mountain ranges may have acted as biogeographic barriers, separating the two taxa by vicariance. However, such a hypothesis can only be tested if additional specimens of *O. hamptoni* are discovered.

We cannot accurately assess the conservation status of *O. hamptoni* based on this singular observation. We do note, however, that the location of this observation is adjacent to the TC-GLGS, a member of the UNESCO World Network of Biosphere Reserves. Given the close proximity of *O. hamptoni* to the reserve, we can assume that the species likely occurs within this region. If true, *O. hamptoni* seems to be very elusive in TC-GLGS because one of us (JHY) had spent 57 field days in the reserve to conduct herpetological surveys between 2014 and 2018, which covered 1360–3000 meters in altitudinal range and different seasons, but did not obtain any record of this species (Yang et al. 2019). Based on the criteria of the IUCN Red List, we recommend listing *O. hamptoni* under the "Data Deficient" category. The surrounding habitat and altitudinal range of our observation is similar to the other two records of *O. hamptoni* from Myanmar, which are situated between 1,200–2,000 meters. The remoteness, combined with the ongoing political instability of northern Myanmar, makes it difficult to ascertain whether future surveys will be able to detect this species any time soon. Nonetheless, we predict that *O. hamptoni* occurs throughout the highlands of the Ayeyarwady drainage basin in Myanmar where suitable habitat exists, particularly in northern Mandalay Region, Shan State and southern Kachin State. The abundance of newly described amphibians and reptiles in the Gaoligongshan National Nature Reserve indicates that much of the region is still unexplored by herpetologists (Yang et al. 2016a, b; Yang and Huang 2019; Yang et al. 2019). We anticipate that future amphibian and reptile surveys here and in adjacent areas in Myanmar will undoubtedly make other new discoveries, and perhaps rediscover additional lost species.

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